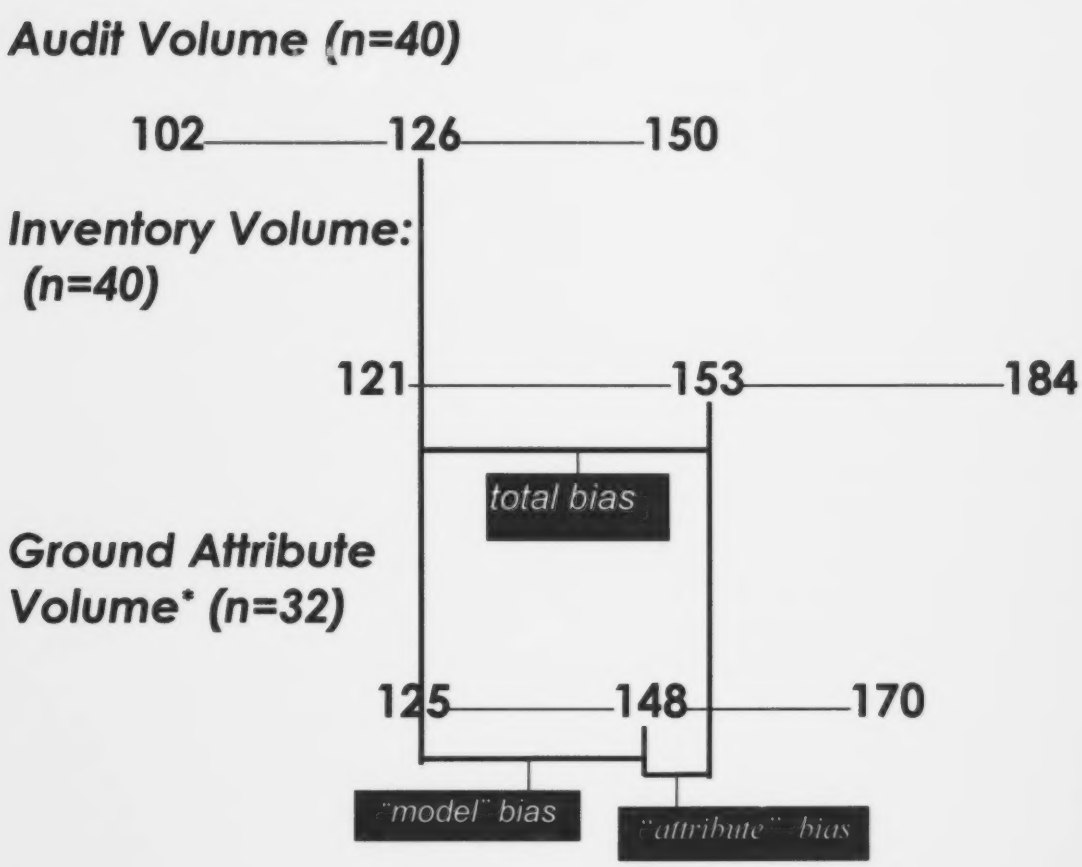
Inventory Audit Results:
Overview TFL 15
February, 1999
DRAFT



* "Ground attribute" volume is calculated from audit sample attributes (i.e. "ground" attributes: stock and stand table estimates of species composition and stocking, and ground-based averages of top height and age), along with crown closure taken from the original map label, using the VDYP yield prediction model. The difference between the ground attribute volume estimate and the audit volume estimate *approximates* the bias associated with the yield model. The difference between the ground attribute volume estimate and the inventory volume estimate *approximates* the bias associated with the inventory classification attributes. These two bias components comprise the *total bias* in the inventory. Note that top height and age (and hence ground attribute volume) was unavailable for 8 samples.

TFL 15 Restratified Audit Samples

Based on restratified polygons that contained the original random start point for the 9 plot cluster

Audit Volume (Kozak) vs. Inventory Volume (Predicted in VDYP) (n=40)

1. Mean Volumes/ha and Confidence Interval @ 95% *(Utilization level : 12.5 cm + net merch. less decay only/Tree Class 1,2)*

102——**126**——**150** Audit Volume (19.4% sampling error)

121——**153**——**184** Inventory Volume (map label attributes predicted in VDYP) (20.7% sampling error)

2. Ratio Analysis : Ratio of Means

$R = \frac{\text{average audit volume}}{\text{average inventory volume}} = 0.82$

1.0
↓
0.63——**0.82**——**1.02**

* *Since 1.0 is within the interval, the ratio indicates that there is no significant difference between the audit volume and the inventory volume.*

3. Paired T Test @ 95% (α=0.05) for all sample polygons

mean difference = -26.78 m^3/ha

p - value for mean difference = 0.109

**since p-value > α, the difference is not significant*

4. Paired T Test @ 95% (α=0.05) for all sample polygons, by map label GTG

There were no significant differences within any of the GTGs.

5. Correlation @ 95% (α=0.05) for all samples

Correlation co-efficient r = 0.327

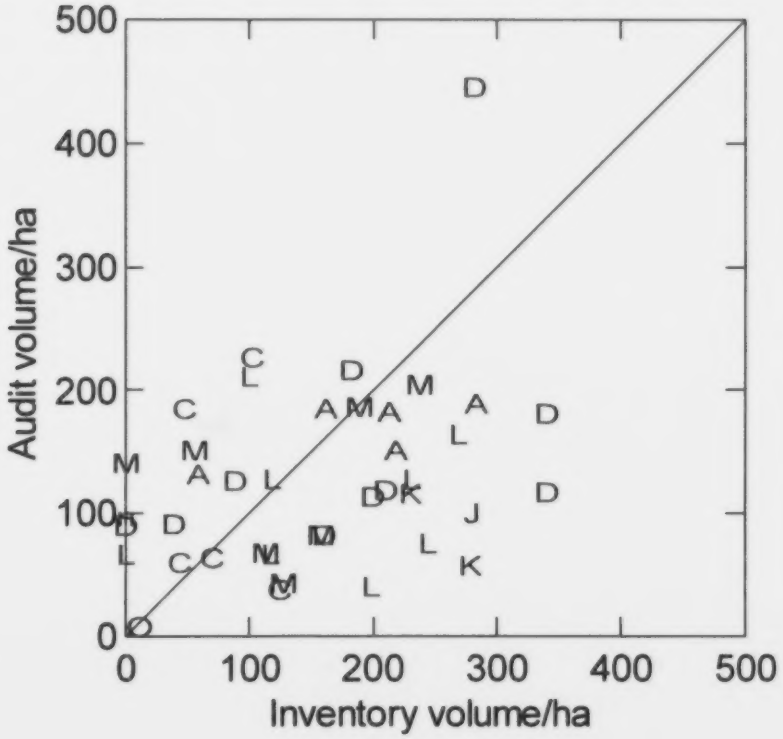
p value for correlation co-efficient = 0.039

∴ correlation is significant

TFL 15 Restratified Audit Samples

Based on restratified polygons that contained the original random start point for the 9 plot cluster

Audit Volume vs. Inventory Volume (by GTG) (n=40)
(Tree Class 1 & 2, less decay only, 12.5cm + dbh)



Letter symbols correspond to map label GTG's as follows:

A	F	*L*	Pl
C	FPl, F Decid., Py, Pa	*M*	PlF, PlS, PlB
D	FL, Pw, LF, L	*O*	D Conif. A Conif.
J	SF, SH, SC, SB	*n*	missing GTG; classified as NSR
K	SPl, SDecid.		

TFL 15 Restratified Audit Samples

Based on restratified polygons that contained the original random start point for the 9 plot cluster

Audit Volume (Kozak) vs. Ground Attribute Volume (Predicted in VDYP): "MODEL BIAS" (n=32[1])

1. Mean Volumes/ha and Confidence Interval @ 95% *(Utilization level : 12.5 cm + net merch. less decay only/Tree Class 1,2)*

105 ——— 133 ——— 161 Audit Volume (n=32) (20.9% sampling error)

125 ——— 148 ——— 170 Ground Attribute Volume (ground attributes predicted in VDYP) (15.0% sampling error)

2. Ratio Analysis : Ratio of Means

$R = \frac{\text{average audit volume}}{\text{average ground attribute volume}} = 0.90$

1.0 ↓

0.73 ——— 0.90 ——— 1.07

* *Since 1.0 is within the interval, the ratio indicates that there is no significant difference between the audit volume and the ground attribute volume.*

3. Paired T Test @ 95% (α=0.05) for all sample polygons

mean difference = -14.74 m^3/ha

p - value for mean difference = 0.204

**since p-value > α, the difference is not significant*

4. Paired T Test @ 95% (α=0.05) for all sample polygons, by map label GTG

There were no significant differences within any of the GTGs.

5. Correlation @ 95% (α=0.05) for all samples

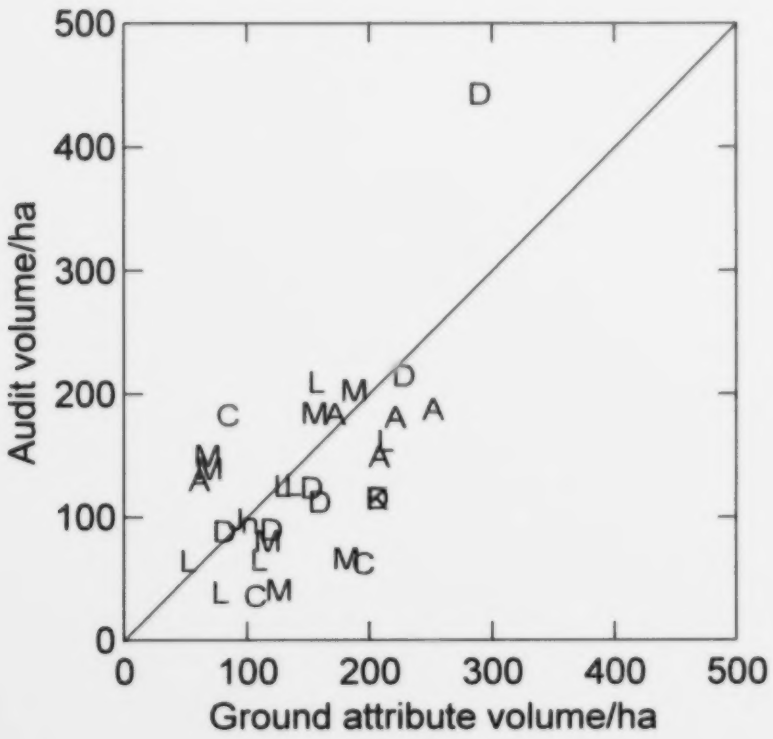
Correlation co-efficient r = 0.590

p value for correlation co-efficient <0.001

.: correlation is significant

[1] Top height and age (and hence ground attribute volume) were unavailable for 8 samples. Hence all statistics on this page are based on the 32 samples for which there were both audit vol/ha and ground attribute vol/ha estimates.

Audit Volume vs. Ground Attribute Volume (by GTG) (n=32)
(Tree Class 1 & 2, less decay only, 12.5cm + dbh)



Letter symbols correspond to map label GTG's as follows:

A	F	*L*	PI
C	FPI, F Decid., Py, Pa	*M*	PIF, PIS, PIB
D	FL, Pw, LF, L	*O*	D Conif. A Conif.
J	SF, SH, SC, SB	*n*	missing GTG; classified as NSR
K	SPI, SDecid.		

TFL 15 Restratified Audit Samples

Based on restratified polygons that contained the original random start point for the 9 plot cluster

Ground Attribute Volume (Predicted in VDYP) vs. Inventory Volume (Predicted in VDYP): "ATTRIBUTE BIAS" (n=32[2])

1. Mean Volumes/ha and Confidence Interval @ 95% *(Utilization level : 12.5 cm + net merch. less decay only/Tree Class 1,2)*

125 —— 148 —— 170 Ground Attribute Volume (15.0% sampling error)

113 —— 148 —— 182 Inventory Volume (n=32) (map label attributes predicted in VDYP) (23.4% sampling error)

2. Ratio Analysis : Ratio of Means

$R = \frac{\text{average ground attribute volume}}{\text{average inventory volume}} = 1.00$

1.0
↓
0.83 —— 1.00 —— 1.17

• *Since 1.0 is within the interval, the ratio indicates that there is no significant difference between the ground attribute volume and the inventory volume.*

3. Paired T Test @ 95% (α=0.05) for all sample polygons

mean difference = -0.10 m^3/ha
p - value for mean difference = 0.994
**since p-value > α, the difference is not significant*

4. Paired T Test @ 95% (α=0.05) for all sample polygons, by map label GTG

There were no significant differences within any of the GTGs.

5. Correlation @ 95% (α=0.05) for all samples

Correlation co-efficient r = 0.683
p value for correlation co-efficient < 0.001
.: correlation is significant

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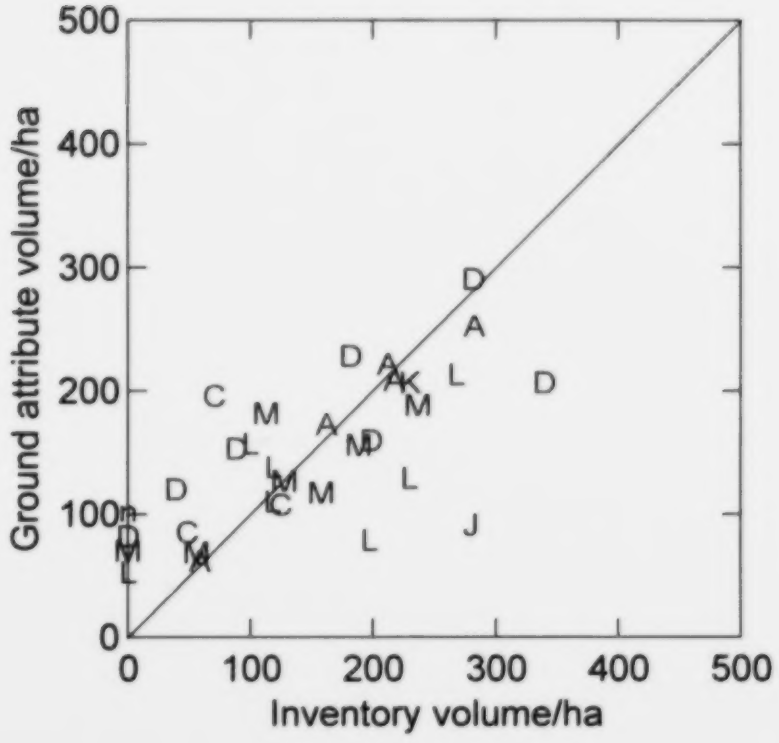
[2] Top height and age (and hence ground attribute volume) were unavailable for 8 samples. Hence all statistics on this page are based on the 32 samples for which there were both audit vol/ha and ground attribute vol/ha estimates.

Ground Attribute Volume vs. Inventory Volume (by GTG) (n=32)
(Tree Class 1 & 2, less decay only, 12.5cm + dbh)



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A	F	*L*	Pl
C	FPl, F Decid., Py, Pa	*M*	PlF, PlS, PlB
D	FL, Pw, LF, L	*O*	D Conif. A Conif.
J	SF, SH, SC, SB	*n*	missing GTG, classified as NSR
K	SPl, SDecid.		

TFL 15 Restratified Audit Samples

Based on restratified polygons that contained the original random start point for the 9 plot cluster

"NSR" sample excluded

Audit Volume (Kozak) vs. Inventory Volume (Predicted in VDYP) (n=39)

1. Mean Volumes/ha and Confidence Interval @ 95% *(Utilization level : 12.5 cm + net merch. less decay only/Tree Class 1,2)*

102——**127**——**152** Audit Volume (19.7% sampling error)

125——**157**——**188** Inventory Volume (map label attributes predicted in VDYP) (20.1% sampling error)

2. Ratio Analysis : Ratio of Means

$R = \frac{\text{average audit volume}}{\text{average inventory volume}} = 0.81$

1.0 ↓

0.62——**0.81**——**1.00**

• *Since 1.0 is within the interval, the ratio indicates that there is no significant difference between the audit volume and the inventory volume.*

3. Paired T Test @ 95% (α=0.05) for all sample polygons

mean difference = -29.91 m^3/ha

p - value for mean difference = 0.077

**since p-value > α, the difference is not significant*

4. Paired T Test @ 95% (α=0.05) for all sample polygons, by map label GTG

There were no significant differences within any of the GTGs.

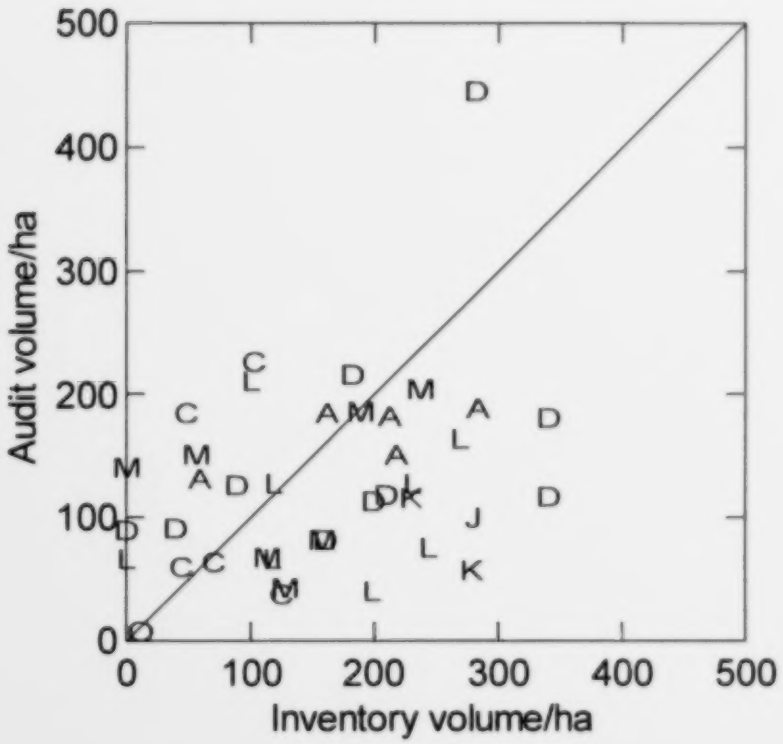
5. Correlation @ 95% (α=0.05) for all samples

Correlation co-efficient r = 0.322

p value for correlation co-efficient = 0.046

∴ correlation is significant

Audit Volume vs. Inventory Volume (by GTG):
NSR sample excluded (n=39)
(Tree Class 1 & 2, less decay only, 12.5cm + dbh)



Letter symbols correspond to map label GTG's as follows:

A	F	*L*	Pl
C	FPl, F Decid., Py, Pa	*M*	PlF, PlS, PlB
D	FL, Pw, LF, L	*O*	D Conif. A Conif.
J	SF, SH, SC, SB	*n*	missing GTG, classified as NSR
K	SPl, SDecid.		

TFL 15 Restratified Audit Samples

Based on restratified polygons that contained the original random start point for the 9 plot cluster

"NSR" sample excluded

Audit Volume (Kozak) vs. Ground Attribute Volume (Predicted in VDYP): "MODEL BIAS" (n=31[3])

1. Mean Volumes/ha and Confidence Interval @ 95% *(Utilization level : 12.5 cm + net merch. less decay only/Tree Class 1,2)*

105 ——— 134 ——— 163 Audit Volume (n=31) (21.4% sampling error)

126 ——— 149 ——— 172 Ground atttribute Volume (ground attributes predicted in VDYP) (15.2% sampling error)

2. Ratio Analysis : Ratio of Means

$R = \frac{\text{average audit volume}}{\text{average ground attribute volume}} = 0.90$

1.0 ↓

0.73 ——— 0.90 ——— 1.07

• *Since 1.0 is within the interval, the ratio indicates that there is no significant difference between the audit volume and the ground attribute volume.*

3. Paired T Test @ 95% (α=0.05) for all sample polygons

mean difference = -15.0 m^3/ha

p - value for mean difference = 0.211

since p-value > α, the difference is not significant

4. Paired T Test @ 95% (α=0.05) for all sample polygons, by map label GTG

There were no significant differences within any of the GTGs.

5. Correlation @ 95% (α=0.05) for all samples

Correlation co-efficient r = 0.585

p value for correlation co-efficient = 0.001

.: correlation is significant

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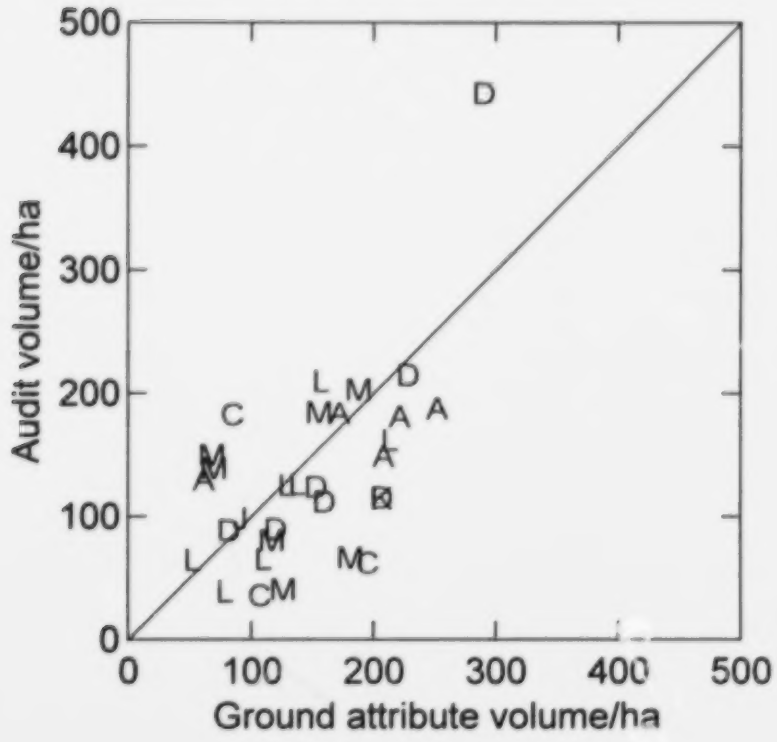
[3] Top height and age (and hence ground attribute volume) were unavailable for several samples. Hence all statistics on this page are based on the 31 samples for which there were both audit vol/ha and ground attribute vol/ha estimates.

Audit Volume vs. Ground Attribute Volume (by GTG):
NSR sample excluded (n=31)
(Tree Class 1 & 2, less decay only, 12.5cm + dbh)



Letter symbols correspond to map label GTG's as follows:

A	F	*L*	PI
C	FPI, F Decid., Py, Pa	*M*	PIF, PIS, PIB
D	FL, Pw, LF, L	*O*	D Conif. A Conif.
J	SF, SH, SC, SB	*n*	missing GTG; classified as NSR
K	SPI, SDecid.		

TFL 15 Restratified Audit Samples

Based on restratified polygons that contained the original random start point for the 9 plot cluster

"NSR" sample excluded

Ground Attribute Volume (Predicted in VDYP) vs. Inventory Volume (Predicted in VDYP): "ATTRIBUTE BIAS" (n=31[4])

1. Mean Volumes/ha and Confidence Interval @ 95% *(Utilization level : 12.5 cm + net merch. less decay only/Tree Class 1,2)*

126——————**149**——————**172** Ground attribute Volume (15.2% sampling error)

118——————**152**——————**187** Inventory Volume (n=31)

(map label attributes predicted in VDYP) (22.5% sampling error)

2. Ratio Analysis : Ratio of Means

$R = \frac{\text{average ground attribute volume}}{\text{average inventory volume}} = 0.98$

1.0
↓
0.82——————**0.98**——————**1.14**

* *Since 1.0 is within the interval, the ratio indicates that there is no significant difference between the ground attribute volume and the inventory volume.*

3. Paired T Test @ 95% (α=0.05) for all sample polygons

mean difference = -3.40 m^3/ha

p - value for mean difference = 0.785

**since p-value > α, the difference is not significant*

4. Paired T Test @ 95% (α=0.05) for all sample polygons, by map label GTG

There were no significant differences within any of the GTGs.

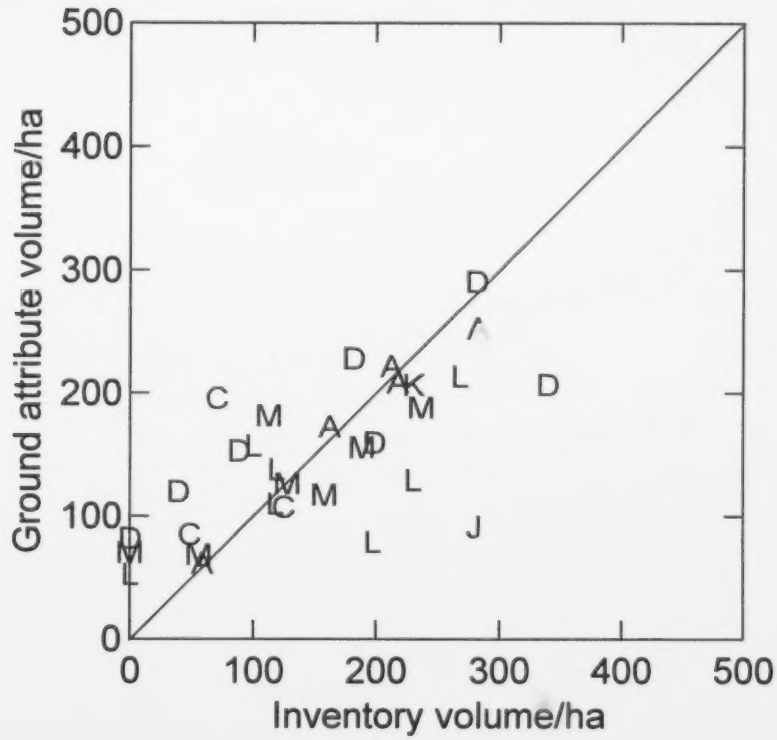
5. Correlation @ 95% (α=0.05) for all samples

Correlation co-efficient r = 0.678

p value for correlation co-efficient <0.001

.: correlation is significant

Ground Attribute Volume vs. Inventory Volume (by GTG):
NSR sample excluded (n=31)
(Tree Class 1 & 2, less decay only, 12.5cm + dbh)



Letter symbols correspond to map label GTG's as follows:

A	F	*L*	PI
C	FPI, F Decid., Py, Pa	*M*	PIF, PIS, PIB
D	FL, Pw, LF, L	*O*	D Conif. A Conif.
J	SF, SH, SC, SB	*n*	missing GTG; classified as NSR
K	SPI, SDecid.		

[4] Top height and age (and hence ground attribute volume) were unavailable for several samples. Hence all statistics on this page are based on the 31 samples for which there were both audit vol/ha and ground attribute vol/ha estimates.

TFL 15 Restratified Audit Samples

Based on restratified polygons that contained the original random start point for the 9 plot cluster

Samples with reclassified inventory age >= 60 years

Audit Volume (Kozak) vs. Inventory Volume (Predicted in VDYP) (n=36)

1. Mean Volumes/ha and Confidence Interval @ 95% *(Utilization level : 12.5 cm + net merch. less decay only/Tree Class 1,2)*

102——**129**——**156**

Audit Volume
(20.8% sampling error)

140——**170**——**200**

Inventory Volume
(map label attributes predicted in VDYP)
(17.8% sampling error)

2. Ratio Analysis : Ratio of Means

$$R = \frac{\text{average audit volume}}{\text{average inventory volume}} = 0.76$$

1.0
↓

0.59——**0.76**——**0.94**

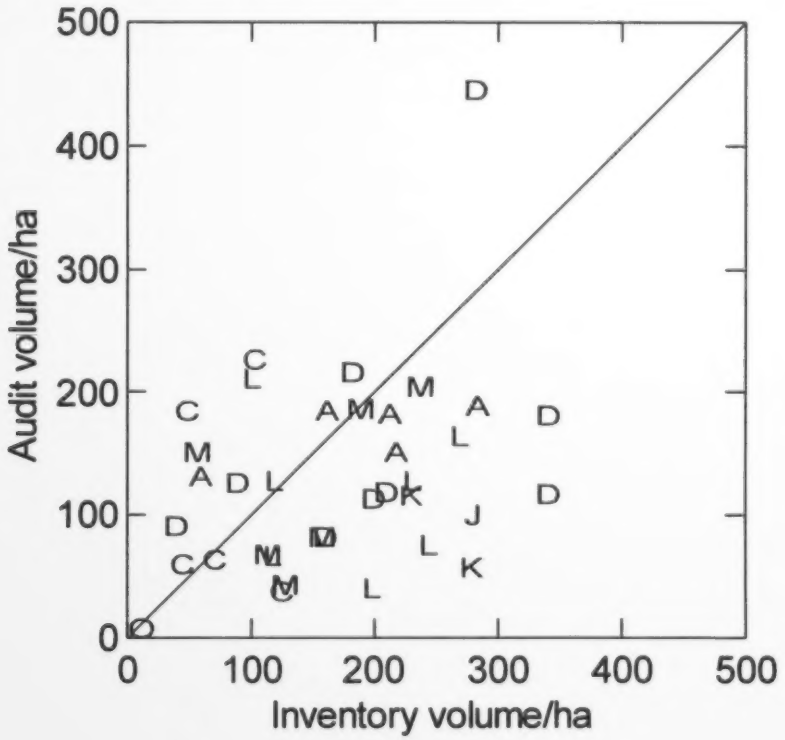
* *Since 1.0 is outside the interval, the ratio indicates that there is a significant difference between the audit volume and the inventory volume.*

3. Paired T Test @ 95% (α=0.05) for samples >=60 years
   mean difference = -40.48 m^3/ha
   p - value for mean difference = 0.020
   **since p-value < α, the difference is significant*

4. Paired T Test @ 95% (α=0.05) for all sample polygons, by map label GTG
   There were no significant differences within any of the GTGs.

5. Correlation @ 95% (α=0.05) for samples >=60 years
   Correlation co-efficient r = 0.309
   p value for correlation co-efficient = 0.067
   ∴ correlation is NOT significant

Audit Volume vs. Inventory Volume (by GTG):
Samples with reclassified inventory age >= 60 years (n=36)
(Tree Class 1 & 2, less decay only, 12.5cm + dbh)



Letter symbols correspond to map label GTG's as follows:

A	F	*L*	PI
C	FPI, F Decid., Py, Pa	*M*	PIF, PIS, PIB
D	FL, Pw, LF, L	*O*	D Conif. A Conif.
J	SF, SH, SC, SB	*n*	missing GTG; classified as NSR
K	SPI, SDecid.		

TFL 15 Restratified Audit Samples

Based on restratified polygons that contained the original random start point for the 9 plot cluster

Samples with reclassified inventory age >= 60 years

Audit Volume (Kozak) vs. Ground Attribute Volume (Predicted in VDYP): "MODEL BIAS" (n=28[5])

1. Mean Volumes/ha and Confidence Interval @ 95% *(Utilization level : 12.5 cm + net merch. less decay only/Tree Class 1,2)*

107 ——— 138 ——— 169 Audit Volume (n=28) (22.6% sampling error)

135 ——— 158 ——— 180 Ground attribute Volume (ground attributes predicted in VDYP) (14.4% sampling error)

2. Ratio Analysis : Ratio of Means

$R = \frac{\text{average audit volume}}{\text{average ground attribute volume}} = 0.87$

1.0 ↓

0.71 ——— 0.87 ——— 1.04

* *Since 1.0 is within the interval, the ratio indicates that there is no significant difference between the audit volume and the ground attribute volume.*

3. Paired T Test @ 95% (α=0.05) for all sample polygons

mean difference = -19.72 m^3/ha

p - value for mean difference = 0.128

**since p-value > α, the difference is not significant*

4. Paired T Test @ 95% (α=0.05) for all sample polygons, by map label GTG

There were no significant within any of the GTGs.

5. Correlation @ 95% (α=0.05) for all samples

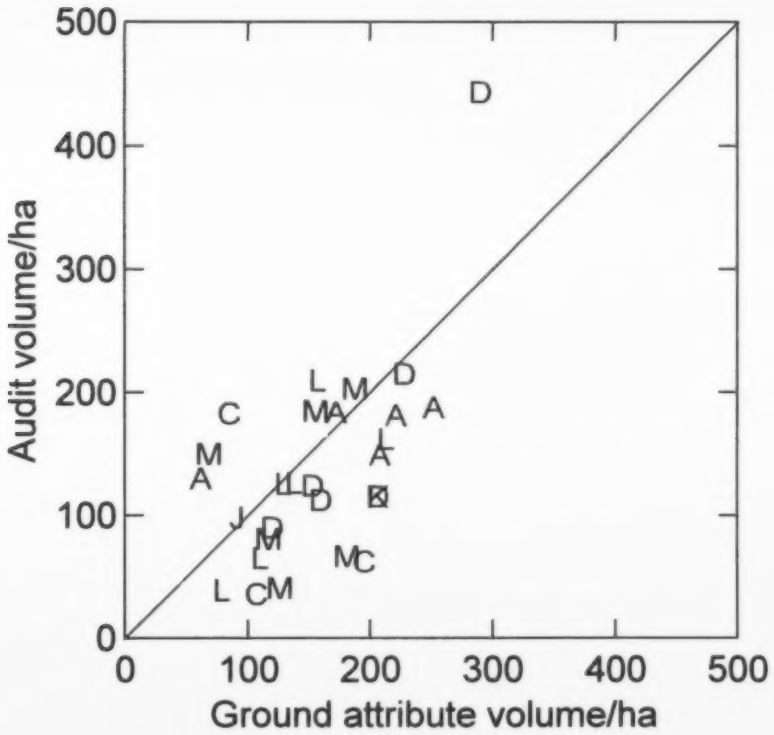
Correlation co-efficient r = 0.584

p value for correlation co-efficient = 0.001

.: correlation is significant

[5] Top height and age (and hence ground attribute volume) were unavailable for several samples. Hence all statistics on this page are based on the 28 samples for which there were both audit vol/ha and ground attribute vol/ha estimates.

Audit Volume vs. Ground Attribute Volume (by GTG):
Samples with reclassified inventory age >= 60 years (n=28)
(Tree Class 1 & 2, less decay only, 12.5cm + dbh)



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A	F	*L*	PI
C	FPI, F Decid., Py, Pa	*M*	PIF, PIS, PIB
D	FL, Pw, LF, L	*O*	D Conif. A Conif.
J	SF, SH, SC, SB	*n*	missing GTG; classified as NSR
K	SPI, SDecid.		

TFL 15 Restratified Audit Samples

Based on restratified polygons that contained the original random start point for the 9 plot cluster

Samples with reclassified inventory age >= 60 years

Ground Attribute Volume (Predicted in VDYP) vs. Inventory Volume (Predicted in VDYP): "ATTRIBUTE BIAS" (n=28[6])

1. Mean Volumes/ha and Confidence Interval @ 95% *(Utilization level : 12.5 cm + net merch. less decay only/Tree Class 1,2)*

135——158——180 Ground attribute Volume (14.4% sampling error)

137——169——201 Inventory Volume (n=28) (map label attributes predicted in VDYP) (19.0% sampling error)

2. Ratio Analysis : Ratio of Means

$$R = \frac{\text{average ground attribute volume}}{\text{average inventory volume}} = 0.93$$

1.0 ↓

0.79——0.93——1.08

* *Since 1.0 is within the interval, the ratio indicates that there is no significant difference between the ground attribute volume and the inventory volume.*

3. Paired T Test @ 95% (α=0.05) for all sample polygons

mean difference = -11.03 m^3/ha

p - value for mean difference = 0.397

**since p-value > α, the difference is not significant*

4. Paired T Test @ 95% (α=0.05) for all sample polygons, by map label GTG

There were no significant differences within any of the GTGs.

4. Correlation @ 95% (α=0.05) for all samples

Correlation co-efficient r = 0.585

p value for correlation co-efficient = 0.001

∴ correlation is significant

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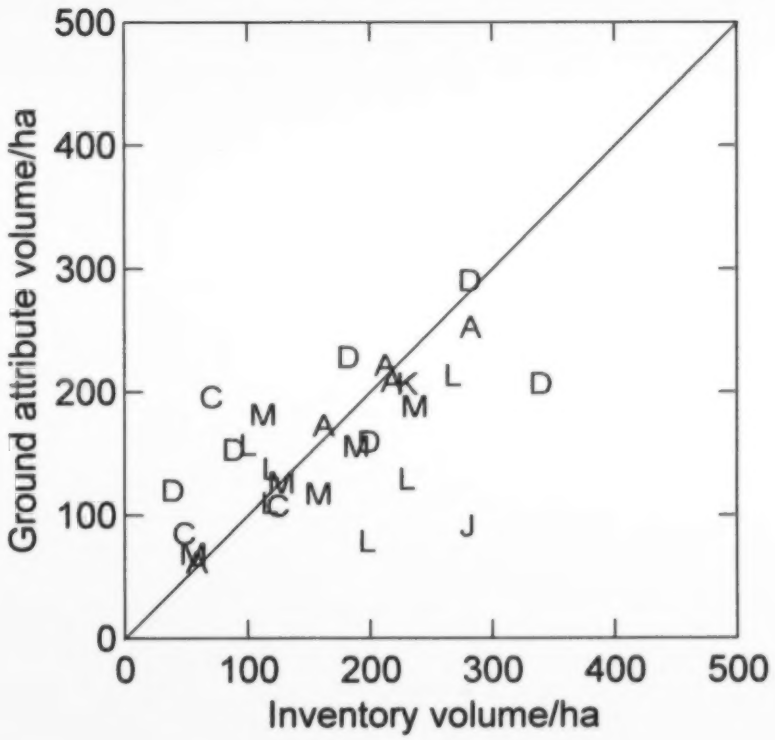
[6] Top height and age (and hence ground attribute volume) were unavailable for several samples. Hence all statistics on this page are based on the 28 samples for which there were both audit vol/ha and ground attribute vol/ha estimates.

Ground Attribute Volume vs. Inventory Volume (by GTG):
Samples with reclassified inventory age >= 60 years (n=28)
(Tree Class 1 & 2, less decay only, 12.5cm + dbh)



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A	F	*L*	PI
C	FPI, F Decid., Py, Pa	*M*	PIF, PIS, PIB
D	FL, Pw, LF, L	*O*	D Conif. A Conif.
J	SF, SH, SC, SB	*n*	missing GTG; classified as NSR
K	SPI, SDecid.		